FIGURE 1
(Prior Art)

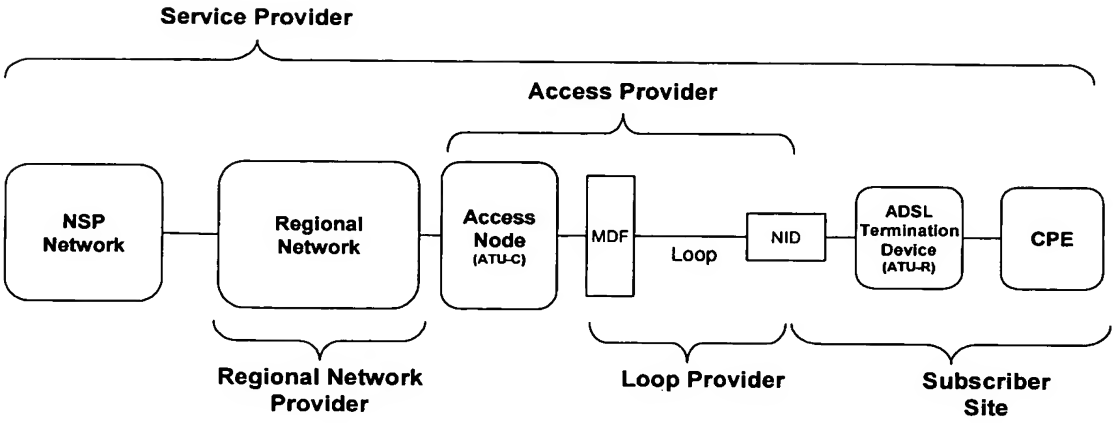


FIGURE 2
(Prior Art)

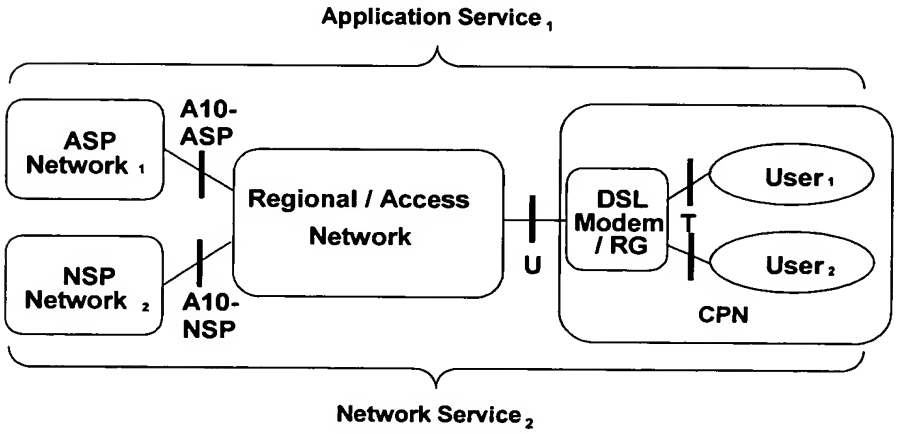


FIGURE 3
(Prior Art)

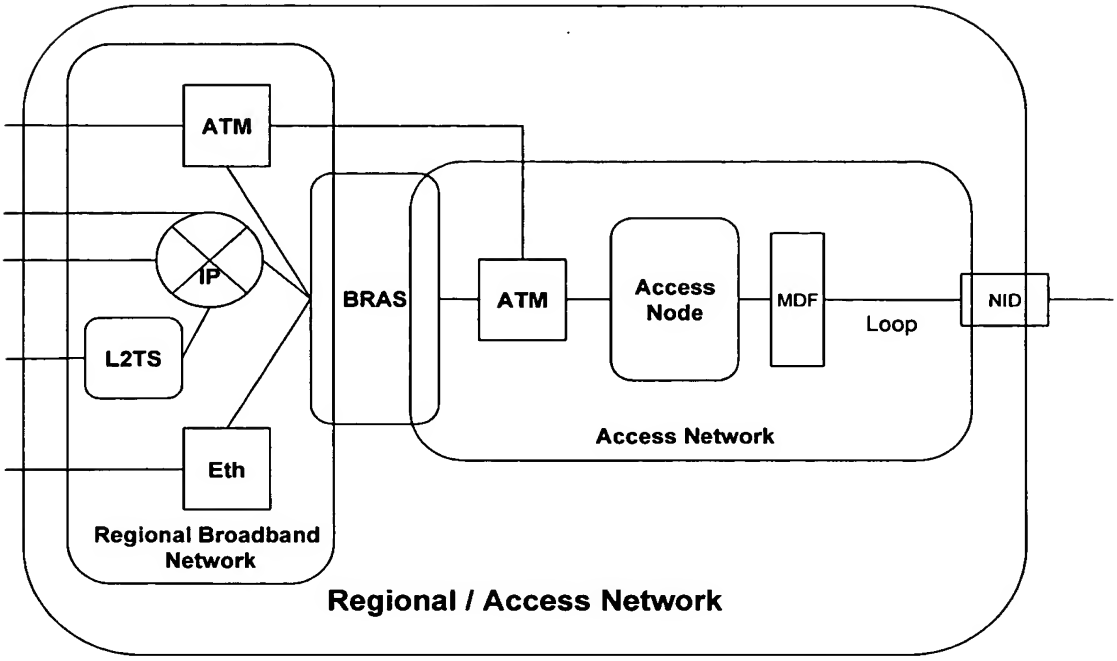


FIGURE 4
(Prior Art)

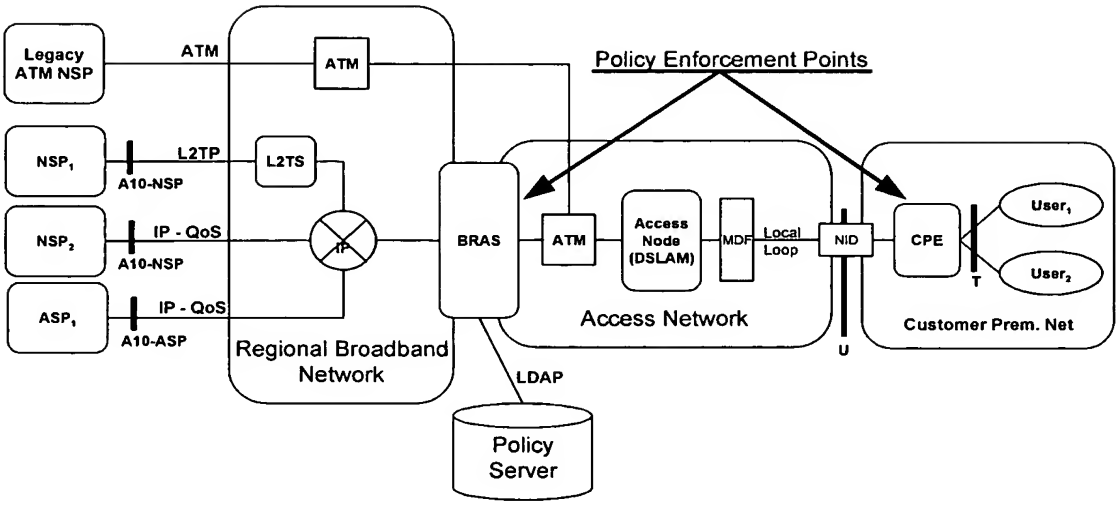


FIGURE 5

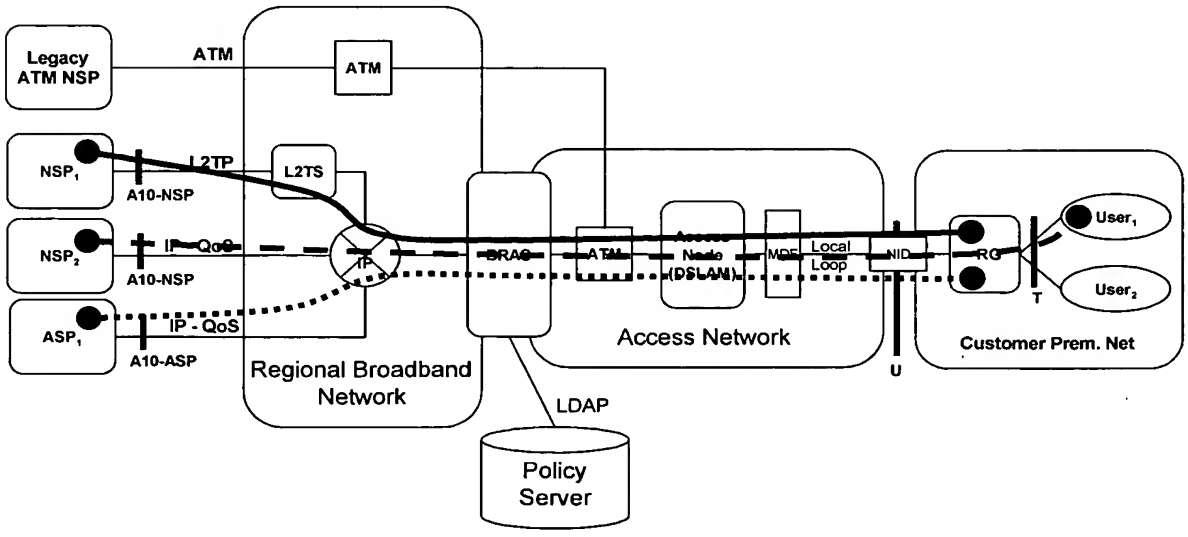


FIGURE 6

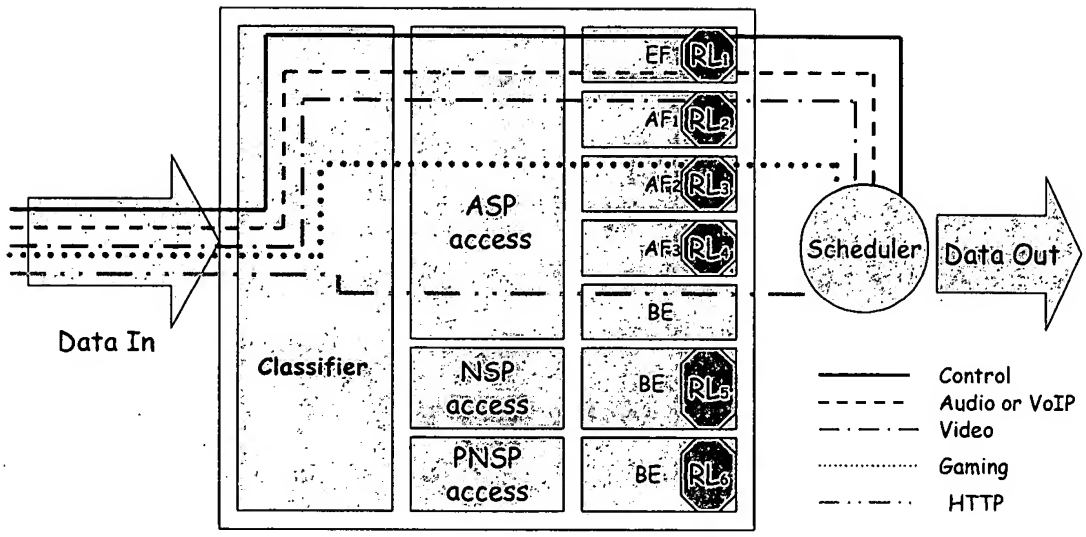


FIGURE 7

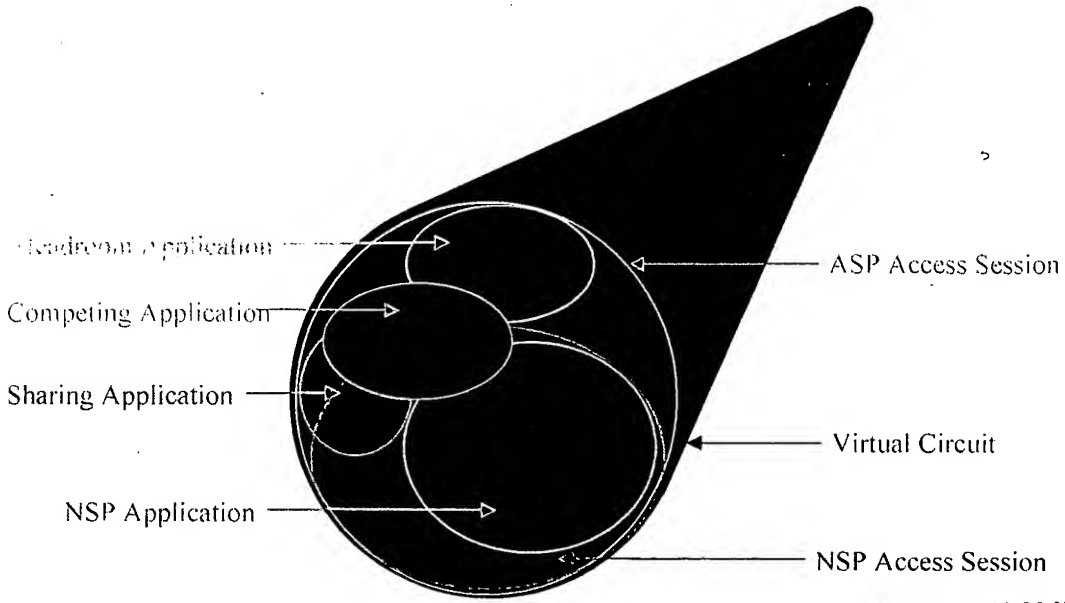
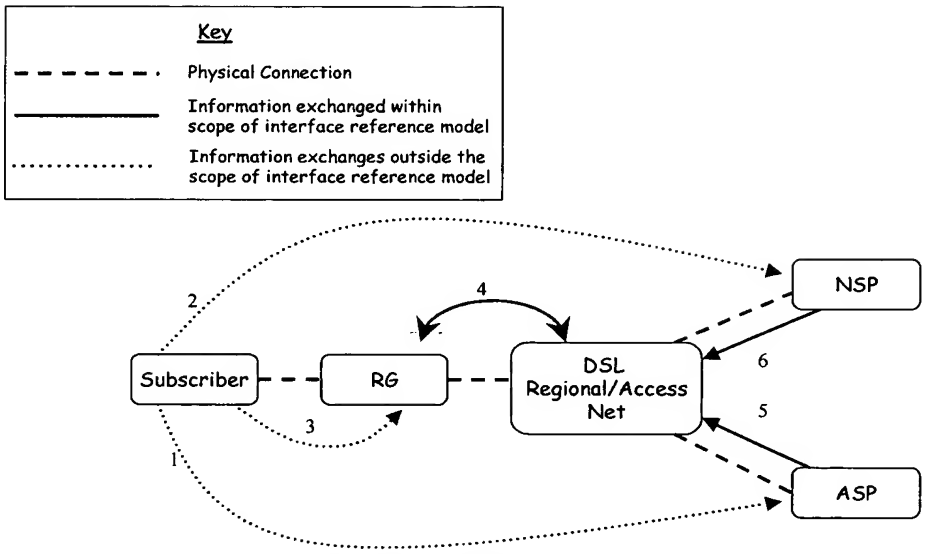


FIGURE 8



1,2: The subscriber exchanges information with the A/NSP when signing up for a service
3: The subscriber configures the RG. This may only be for the initial install. The ACS located within the Regional/Access Network may handle all subsequent conf changes
4: The RG initiates access sessions that are terminated in the DSL network. The ACS communicates with the RG for configuration updates.
5,6: The NSP communicates with the DSL network to establish a DSL connection. The ASP and NSP also communicate bandwidth and QoS changes per session or application.

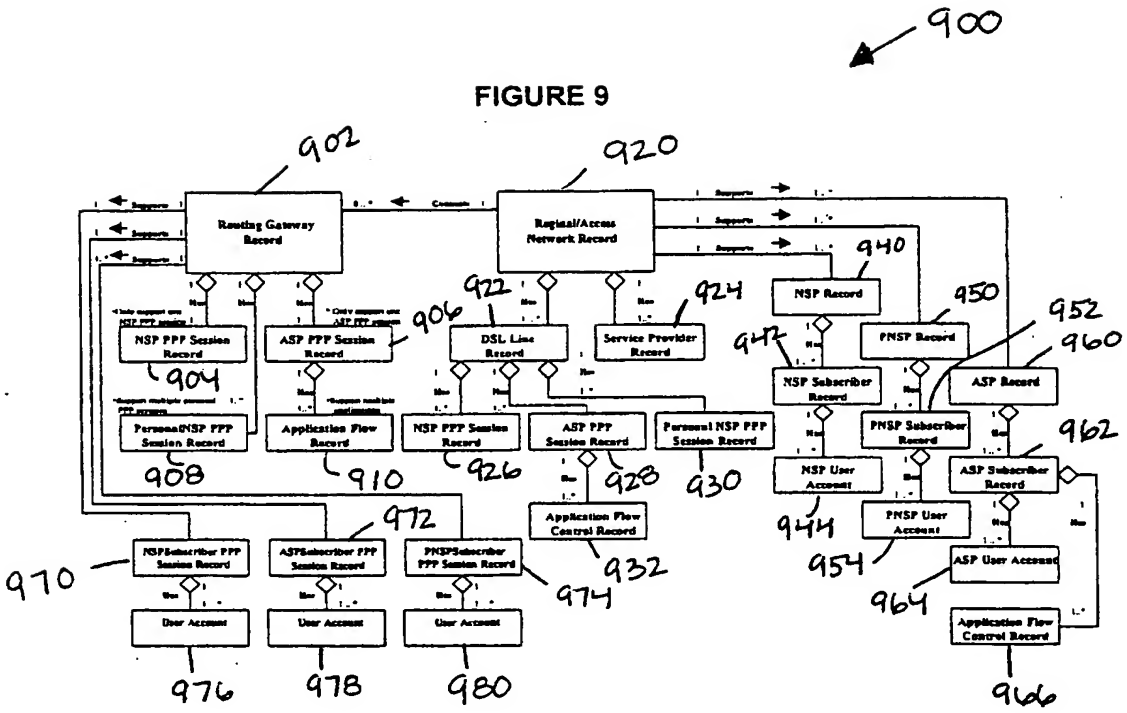

900
902
920
Routing Gateway Record
Regional Access Network Record
940
NSP Record
950
PNSP Record
952
960
NSP PPP Session Record
904
ASP PPP Session Record
906
DSL Line Record
922
Service Provider Record
924
NSP Subscriber Record
ASP Record
PersonalNSP PPP Session Record
908
Application Flow Record
910
NSP PPP Session Record
926
ASP PPP Session Record
928
Personal NSP PPP Session Record
930
PNSP Subscriber Record
962
NSP User Account
944
ASP Subscriber Record
PNSP User Account
954
Application Flow Control Record
932
ASP User Account
964
970
NSPSubscriber PPP Session Record
972
ASPSubscriber PPP Session Record
PNSPSubscriber PPP Session Record
974
User Account
976
User Account
978
User Account
980
Application Flow Control Record
966

FIGURE 9

FIGURE 10

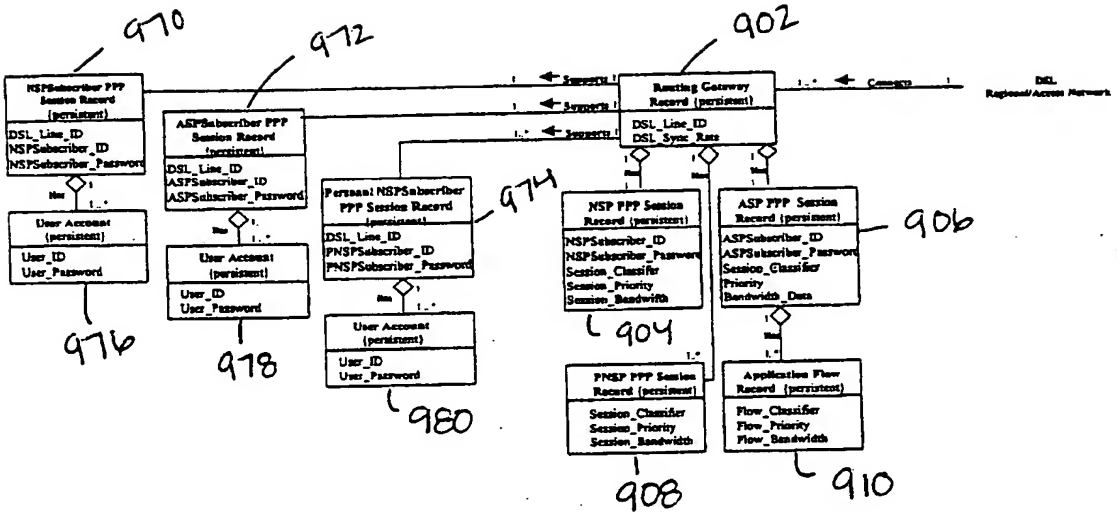

970
972
902
NSPSubscriber PPP Session Record (persistent)
DSL_Line_ID
NSPSubscriber_ID
NSPSubscriber_Password
ASPSubscriber PPP Session Record (persistent)
DSL_Line_ID
ASPSubscriber_ID
ASPSubscriber_Password
Routing Gateway Record (persistent)
DSL_Line_ID
DSL_Sync_Rate
DSL Regional Access Network
User Account (persistent)
User_ID
User_Password
976
User Account (persistent)
User_ID
User_Password
978
Personal NSPSubscriber PPP Session Record (persistent)
974
DSL_Line_ID
PNSPSubscriber_ID
PNSPSubscriber_Password
User Account (persistent)
User_ID
User_Password
980
NSP PPP Session Record (persistent)
NSPSubscriber_ID
NSPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
904
ASP PPP Session Record (persistent)
906
ASPSubscriber_ID
ASPSubscriber_Password
Session_Classifier
Priority
Bandwidth_Data
PNSP PPP Session Record (persistent)
Session_Classifier
Session_Priority
Session_Bandwidth
908
Application Flow Record (persistent)
Flow_Classifier
Flow_Priority
Flow_Bandwidth
910

FIGURE 11

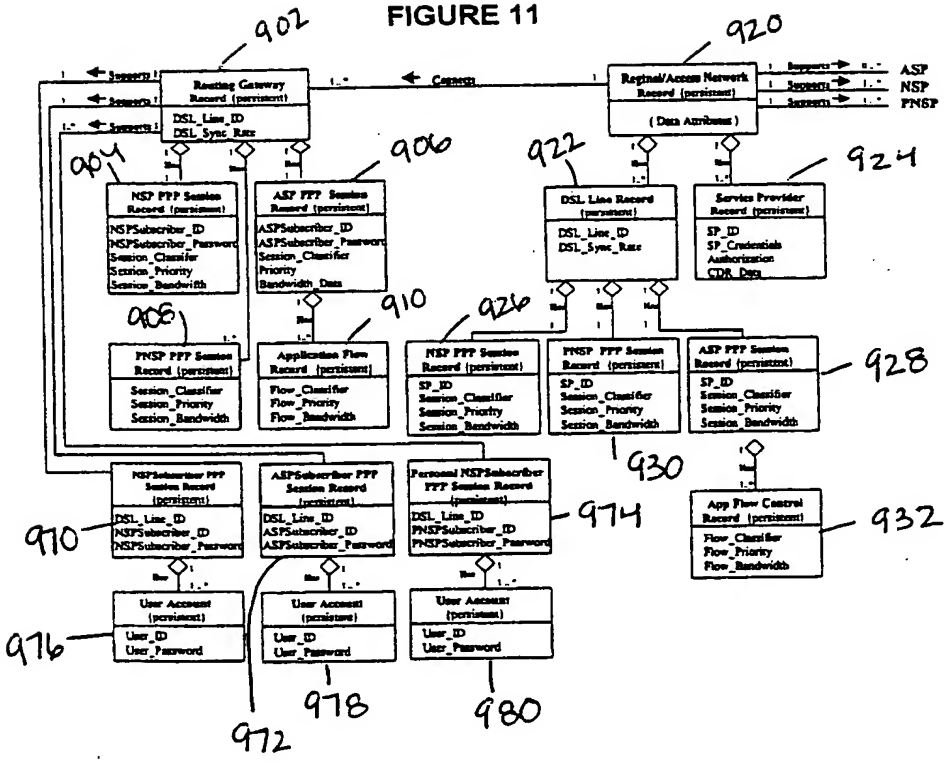

902
920
Routing Gateway Record (persistent)
DSL_Line_ID
DSL_Sync_Rate
Regional/Access Network Record (persistent)
(Data Attributes)
Supports
Connects
ASP
NSP
PNSP
904
906
922
924
NSP PPP Session Record (persistent)
NSPSubscriber_ID
NSPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
ASP PPP Session Record (persistent)
ASPSubscriber_ID
ASPSubscriber_Password
Session_Classifier
Priority
Bandwidth_Data
DSL Line Record (persistent)
DSL_Line_ID
DSL_Sync_Rate
Service Provider Record (persistent)
SP_ID
SP_Credentials
Authorization
CDR_Data
908
910
926
928
PNSP PPP Session Record (persistent)
Session_Classifier
Session_Priority
Session_Bandwidth
Application Flow Record (persistent)
Flow_Classifier
Flow_Priority
Flow_Bandwidth
NSP PPP Session Record (persistent)
SP_ID
Session_Classifier
Session_Priority
Session_Bandwidth
PNSP PPP Session Record (persistent)
SP_ID
Session_Classifier
Session_Priority
Session_Bandwidth
ASP PPP Session Record (persistent)
SP_ID
Session_Classifier
Session_Priority
Session_Bandwidth
930
NSPSubscriber PPP Session Record (persistent)
DSL_Line_ID
NSPSubscriber_ID
NSPSubscriber_Password
ASPSubscriber PPP Session Record (persistent)
DSL_Line_ID
ASPSubscriber_ID
ASPSubscriber_Password
Personal NSPSubscriber PPP Session Record (persistent)
DSL_Line_ID
PNSPSubscriber_ID
PNSPSubscriber_Password
974
App Flow Control Record (persistent)
Flow_Classifier
Flow_Priority
Flow_Bandwidth
932
910
User Account (persistent)
User_ID
User_Password
User Account (persistent)
User_ID
User_Password
User Account (persistent)
User_ID
User_Password
976
978
980
972

FIGURE 12

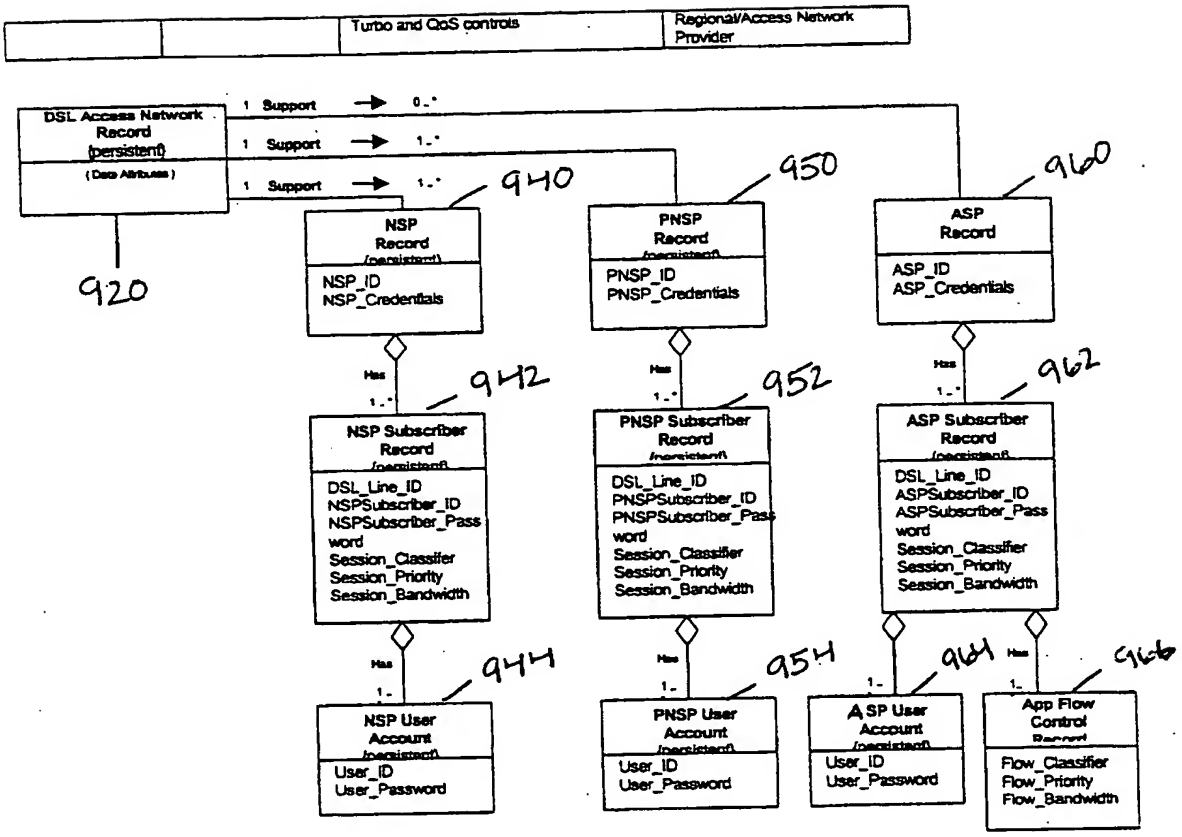

Turbo and QoS controls
Regional/Access Network Provider
DSL Access Network Record (persistent)
(Data Attributes)
1 Support 0..*
1 Support 1..*
1 Support 1..*
920
NSP Record (persistent)
NSP_ID
NSP_Credentials
940
PNSP Record (persistent)
PNSP_ID
PNSP_Credentials
950
ASP Record
ASP_ID
ASP_Credentials
960
Has 1..*
NSP Subscriber Record (persistent)
DSL_Line_ID
NSPSubscriber_ID
NSPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
942
PNSP Subscriber Record (persistent)
DSL_Line_ID
PNSPSubscriber_ID
PNSPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
952
ASP Subscriber Record (persistent)
DSL_Line_ID
ASPSubscriber_ID
ASPSubscriber_Password
Session_Classifier
Session_Priority
Session_Bandwidth
962
Has 1..
NSP User Account (persistent)
User_ID
User_Password
944
PNSP User Account (persistent)
User_ID
User_Password
954
ASP User Account (persistent)
User_ID
User_Password
964
App Flow Control Record
Flow_Classifier
Flow_Priority
Flow_Bandwidth
966

FIGURE 13

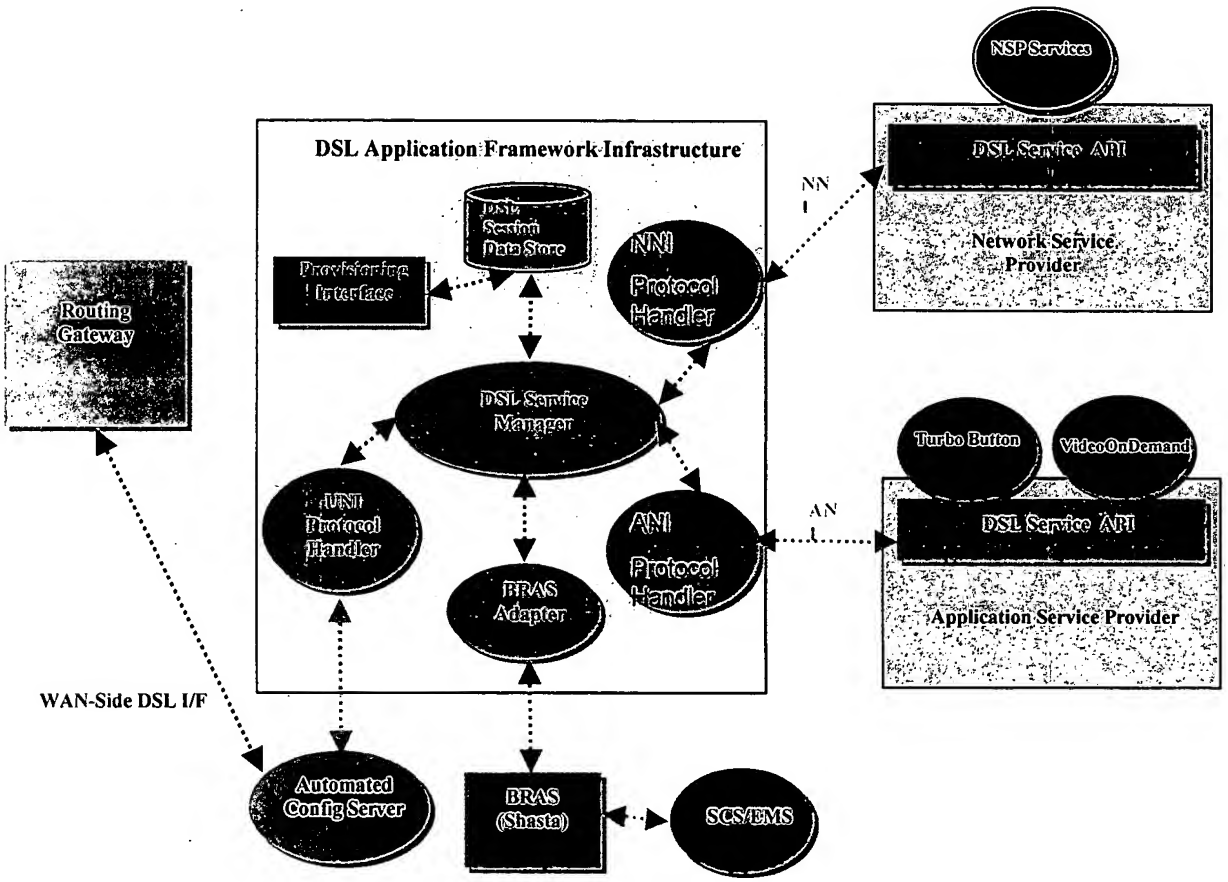


FIGURE 14

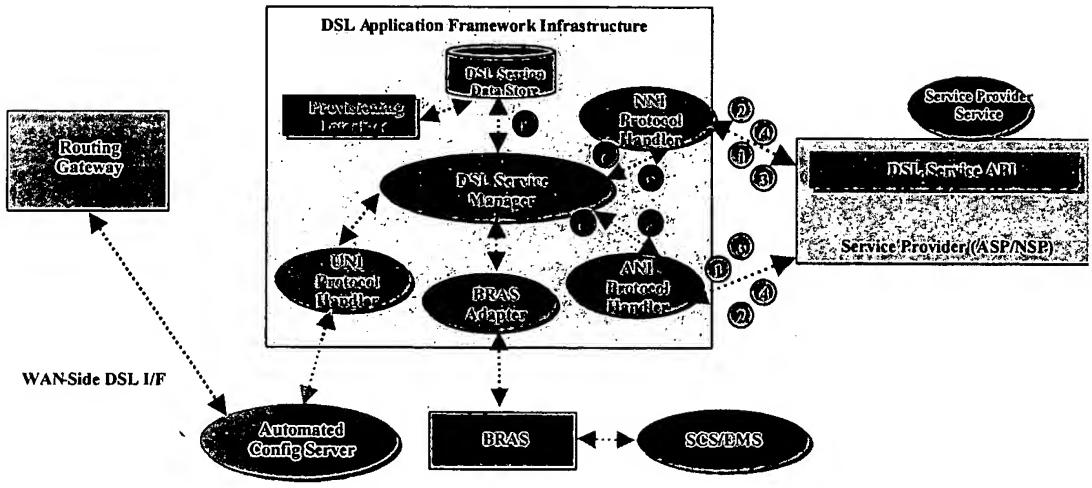


FIGURE 15

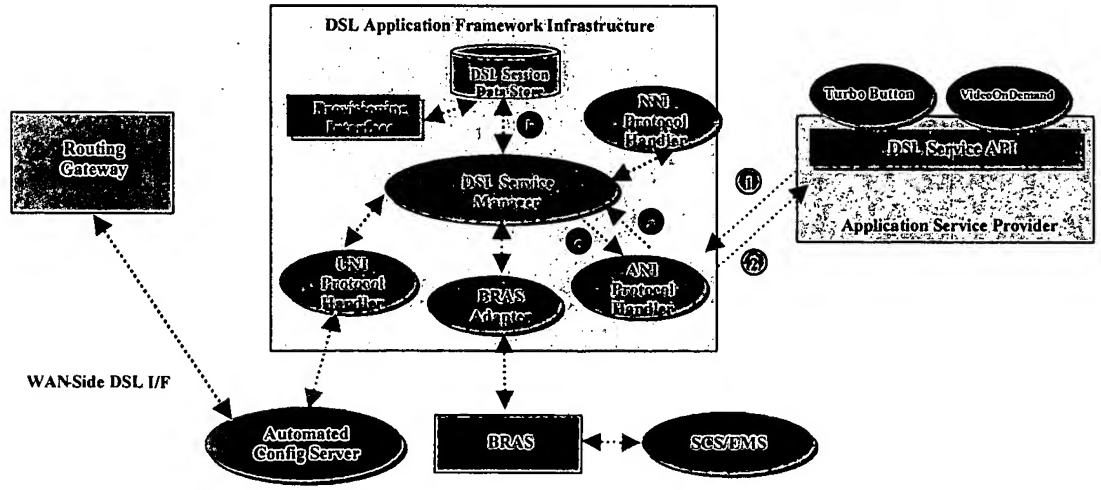


FIGURE 16

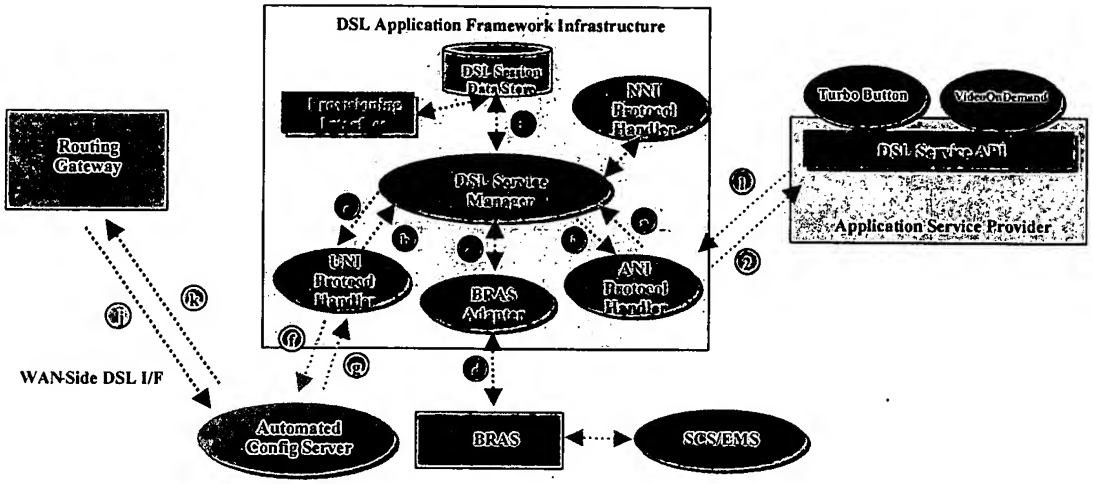


FIGURE 17

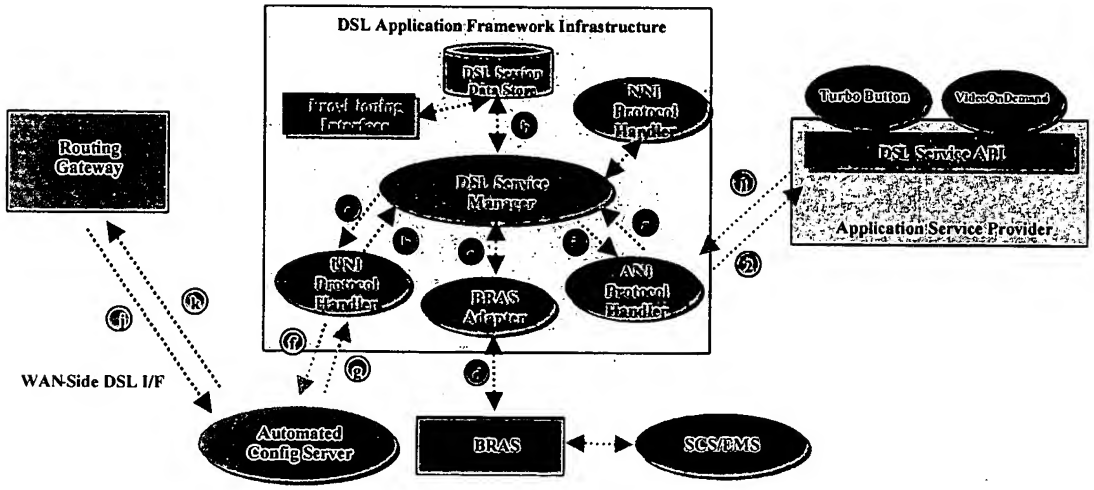


FIGURE 18

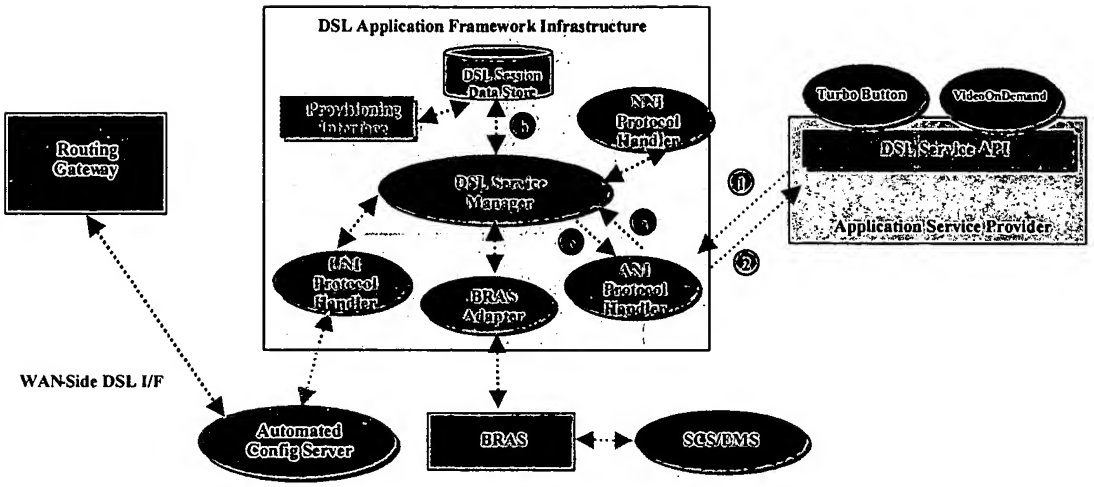


FIGURE 19

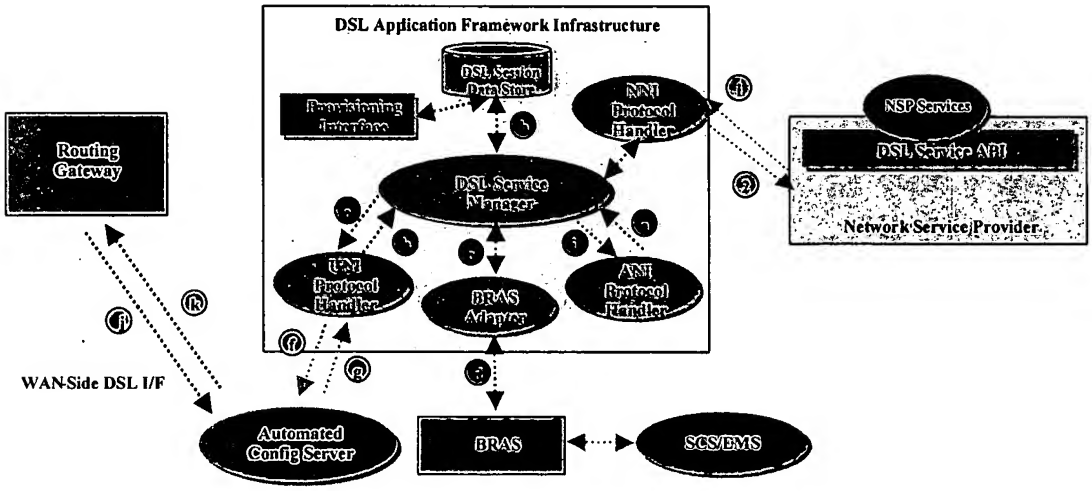


FIGURE 20

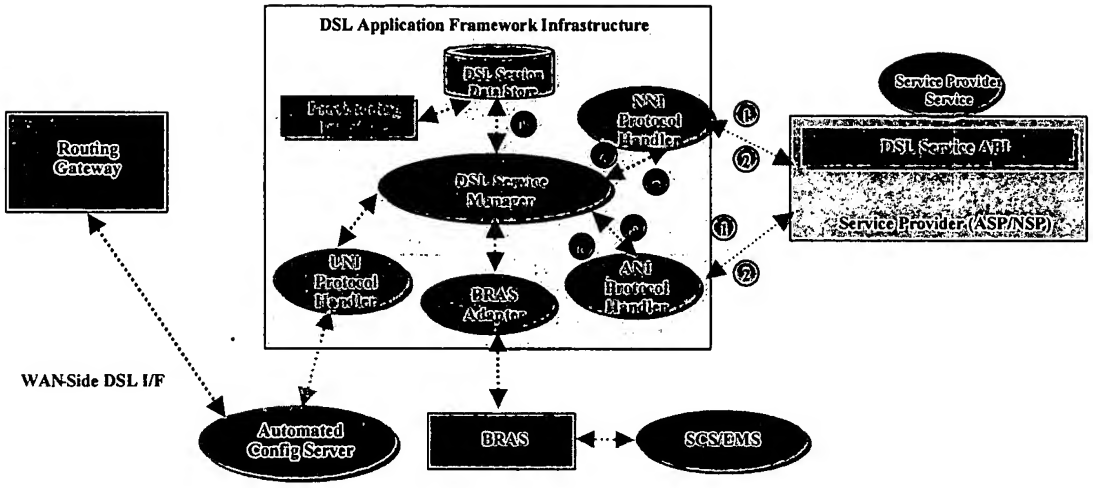


FIGURE 21

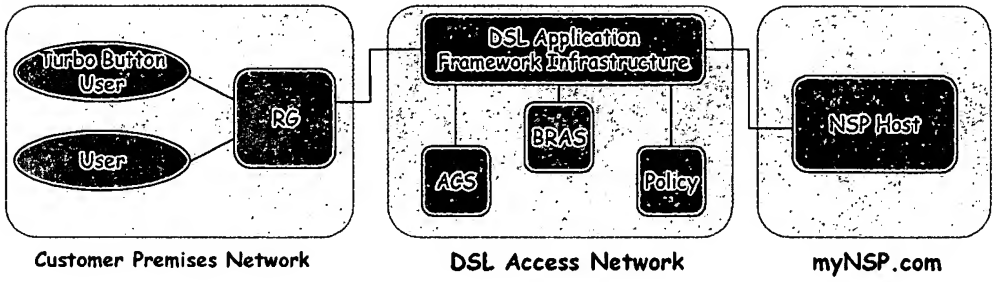


FIGURE 22

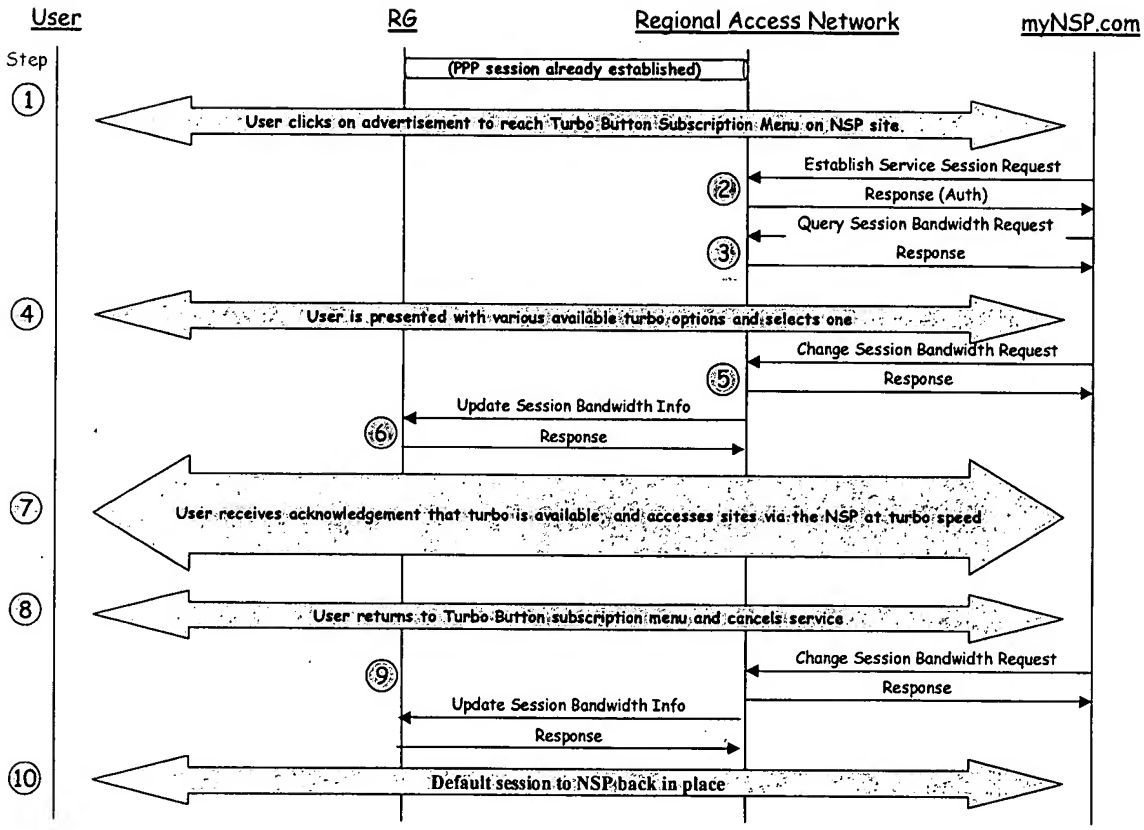

User
RG
Regional Access Network
myNSP.com
Step
(PPP session already established)
1
User clicks on advertisement to reach Turbo Button Subscription Menu on NSP site.
Establish Service Session Request
2
Response (Auth)
Query Session Bandwidth Request
3
Response
4
User is presented with various available turbo options and selects one
Change Session Bandwidth Request
5
Response
Update Session Bandwidth Info
6
Response
7
User receives acknowledgement that turbo is available, and accesses sites via the NSP at turbo speed
8
User returns to Turbo Button subscription menu and cancels service
Change Session Bandwidth Request
9
Response
Update Session Bandwidth Info
Response
10
Default session to NSP back in place

FIGURE 23

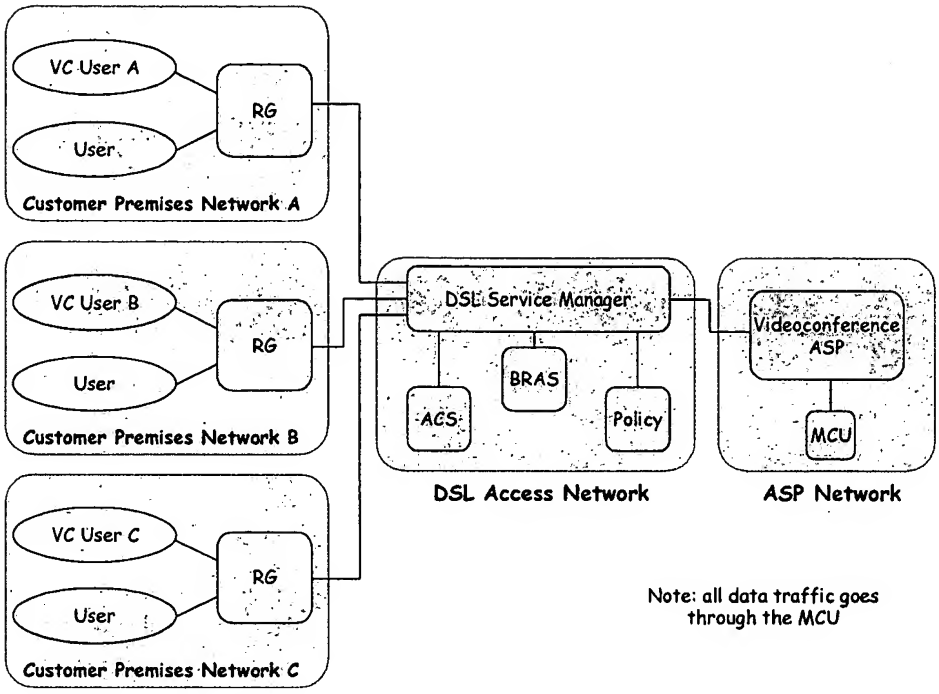

VC User A
User
RG
Customer Premises Network A
VC User B
User
RG
Customer Premises Network B
VC User C
User
RG
Customer Premises Network C
DSL Service Manager
BRAS
ACS
Policy
DSL Access Network
Videoconference ASP
MCU
ASP Network
Note: all data traffic goes through the MCU

FIGURE 24

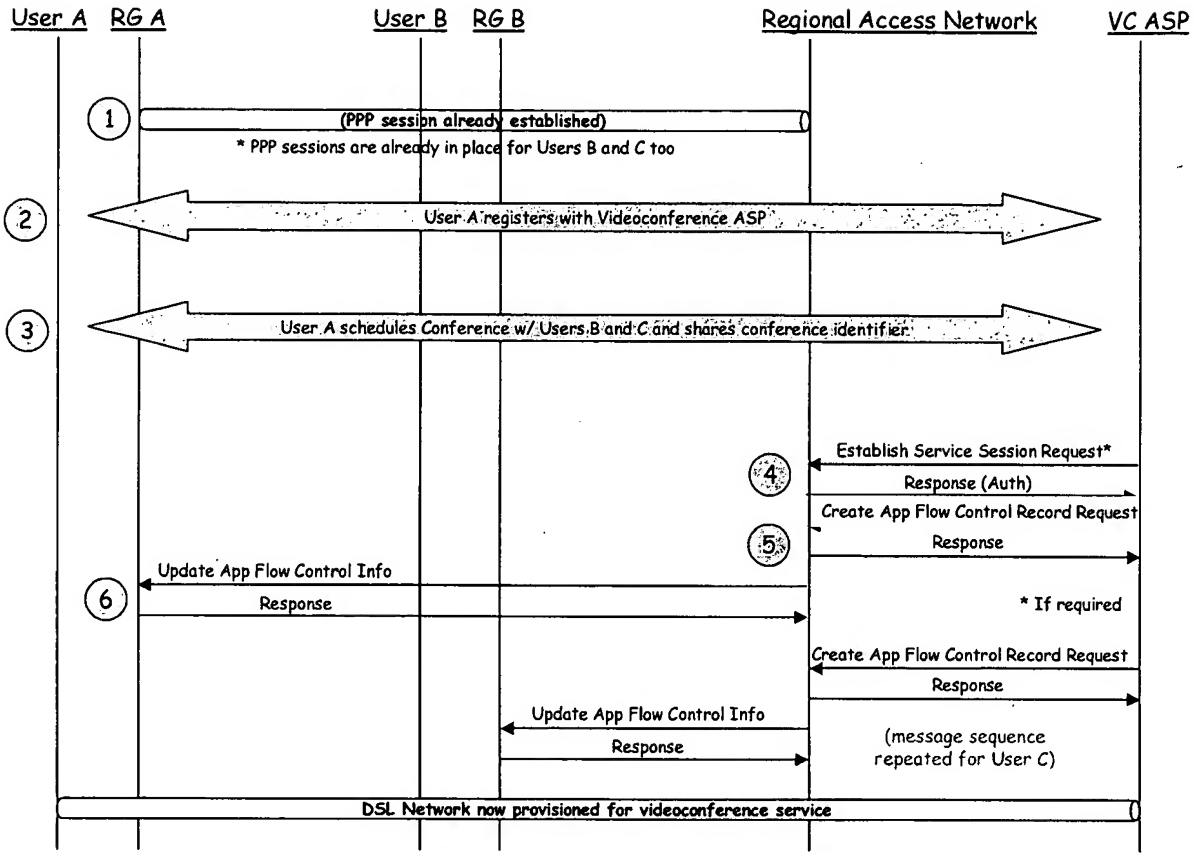

User A
RG A
User B
RG B
Regional Access Network
VC ASP
1
(PPP session already established)
* PPP sessions are already in place for Users B and C too
2
User A registers with Videoconference ASP
3
User A schedules Conference w/ Users B and C and shares conference identifier
Establish Service Session Request*
4
Response (Auth)
Create App Flow Control Record Request
5
Response
Update App Flow Control Info
6
Response
* If required
Create App Flow Control Record Request
Response
Update App Flow Control Info
Response
(message sequence repeated for User C)
DSL Network now provisioned for videoconference service

FIGURE 25

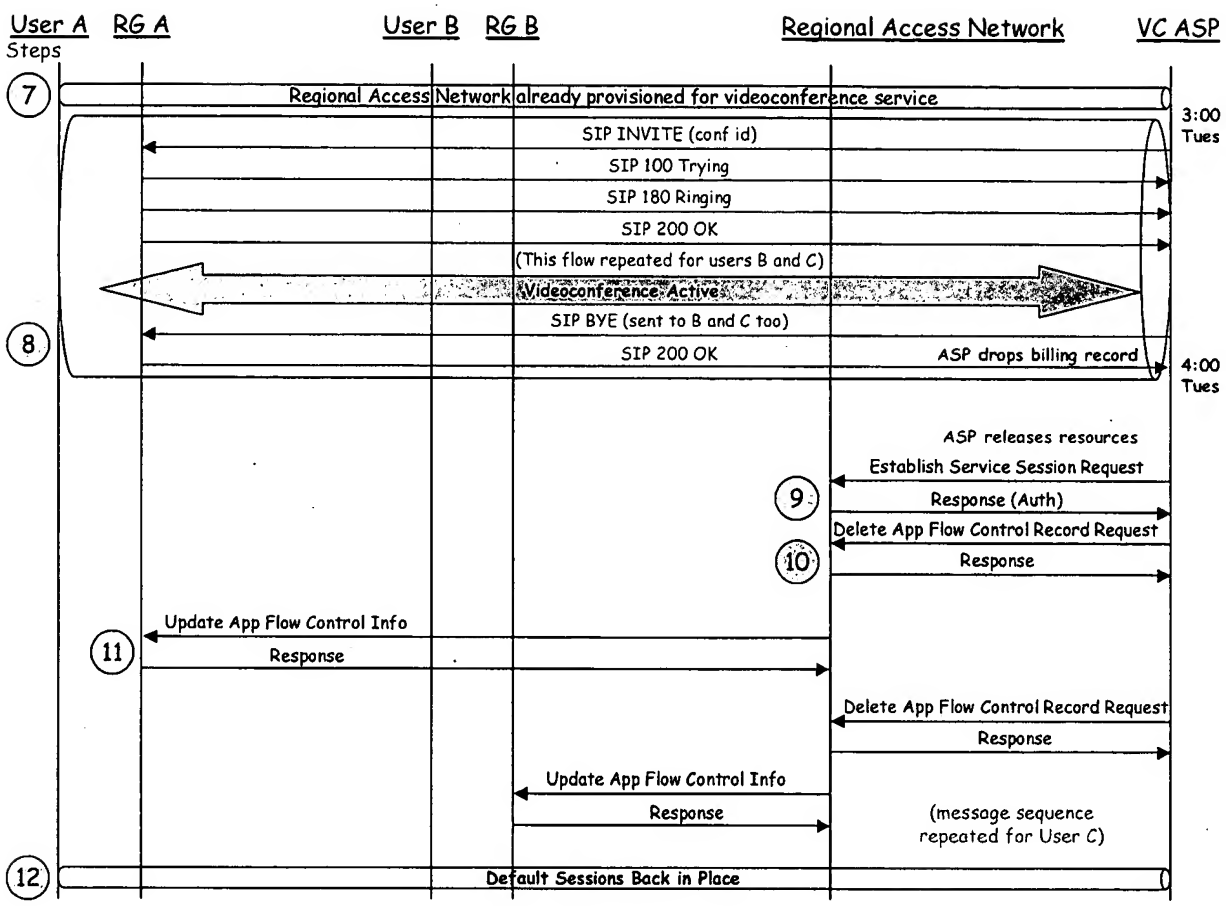

User A
RG A
User B
RG B
Regional Access Network
VC ASP
Steps
7
Regional Access Network already provisioned for videoconference service
3:00 Tues
SIP INVITE (conf id)
SIP 100 Trying
SIP 180 Ringing
SIP 200 OK
(This flow repeated for users B and C)
Videoconference Active
8
SIP BYE (sent to B and C too)
SIP 200 OK
ASP drops billing record
4:00 Tues
ASP releases resources
Establish Service Session Request
9
Response (Auth)
Delete App Flow Control Record Request
10
Response
Update App Flow Control Info
11
Response
Delete App Flow Control Record Request
Response
Update App Flow Control Info
Response
(message sequence repeated for User C)
12
Default Sessions Back in Place

FIGURE 26

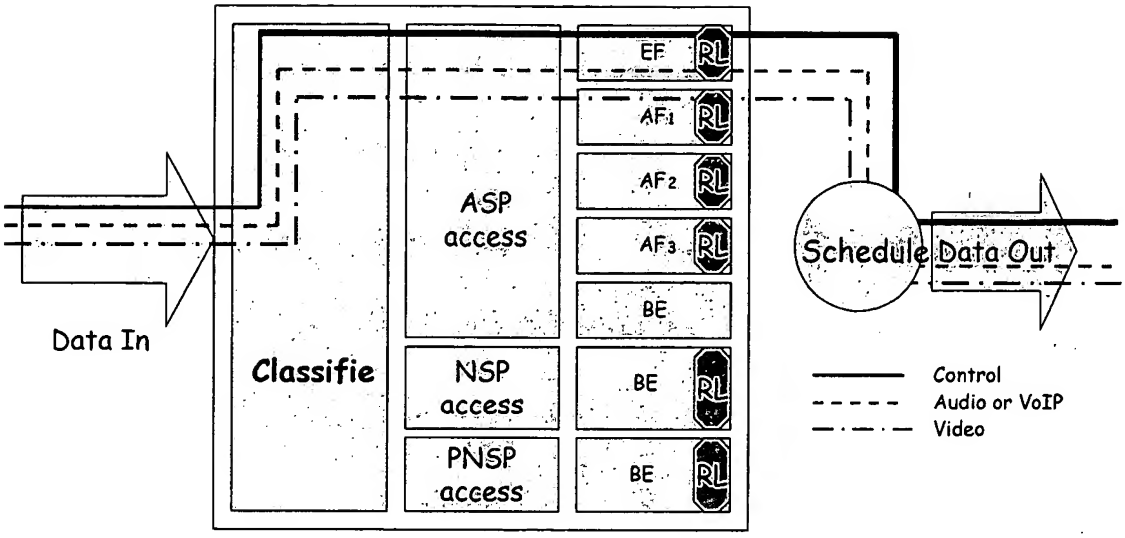
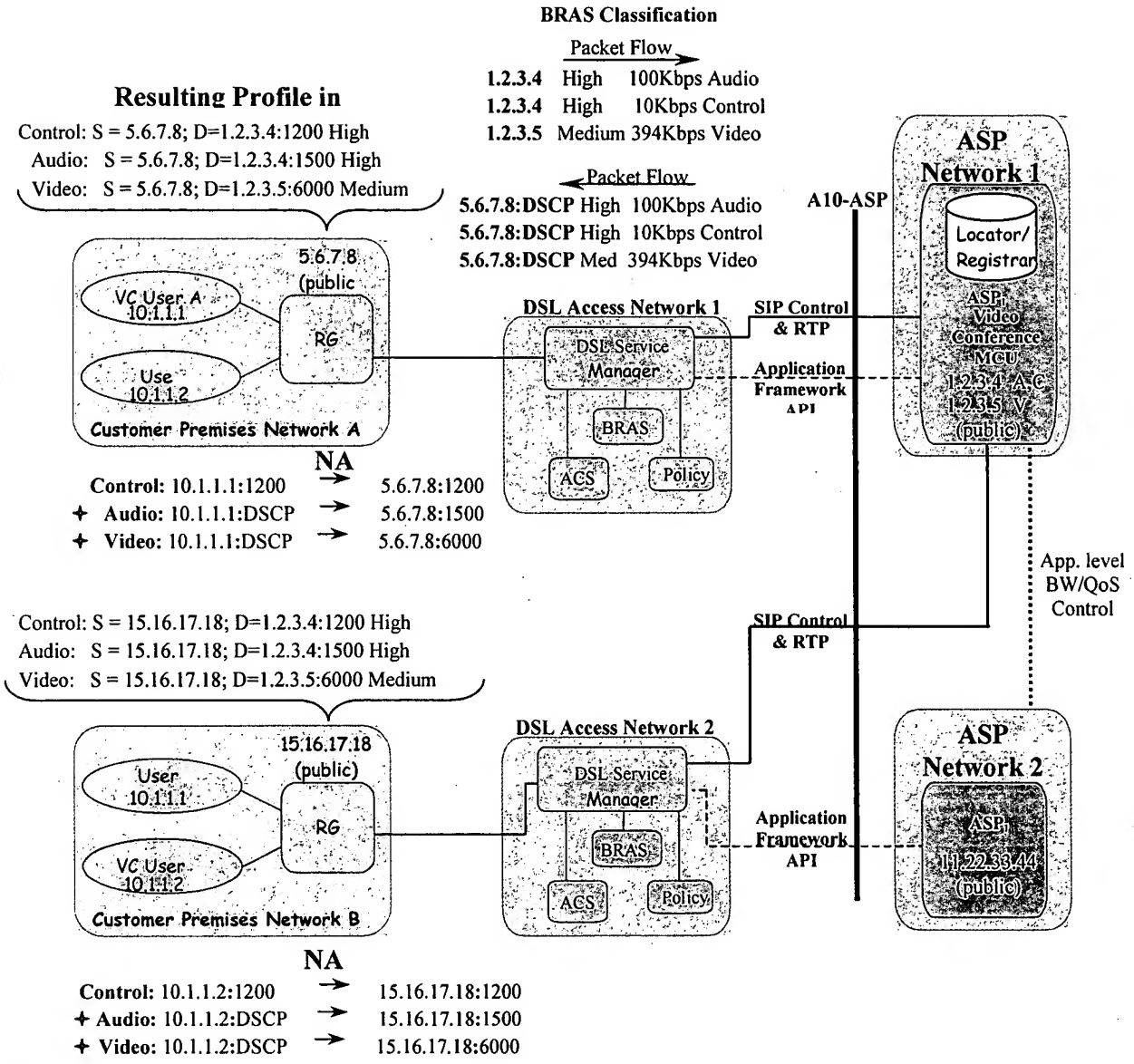

Data In
Classifie
ASP access
NSP access
PNSP access
EF
AF1
AF2
AF3
BE
BE
BE
RL
Schedule
Data Out
Control
Audio or VoIP
Video

FIGURE 27



+ These flows are set up dynamically at the VC client and the DSCP are assigned for the audio and the video streams. The ALG/NAT maps the 10.X.X.X ports to the corresponding IP address and ports for audio and video specified in the ACS profile based on the DSCP set by the VC client. This ensures that the RG, BRAS, and ASP videoconference MCU maintain consistent port information with regard to the various flows.

FIGURE 28

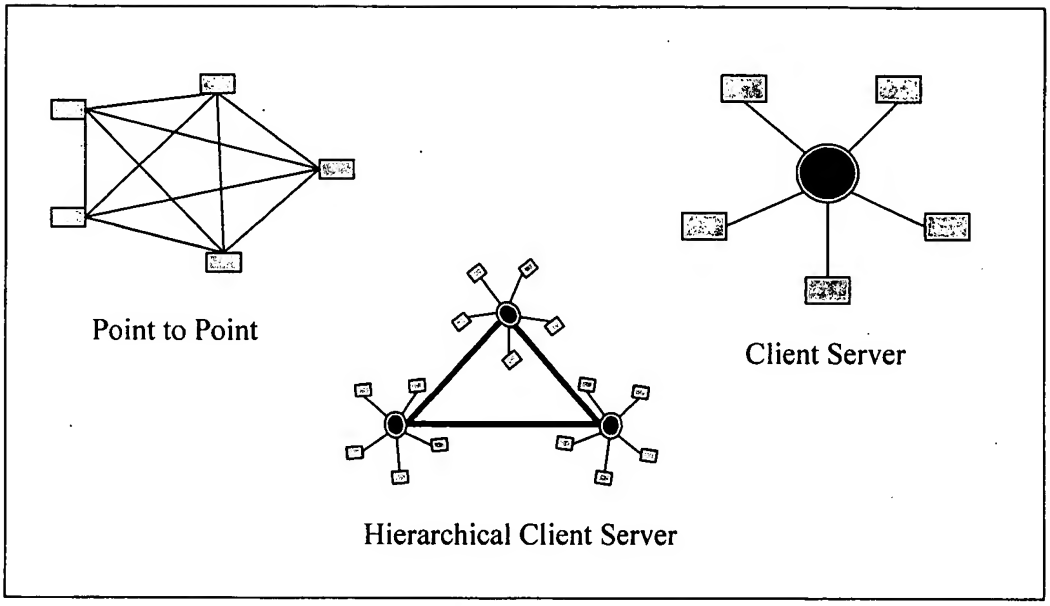


FIGURE 29

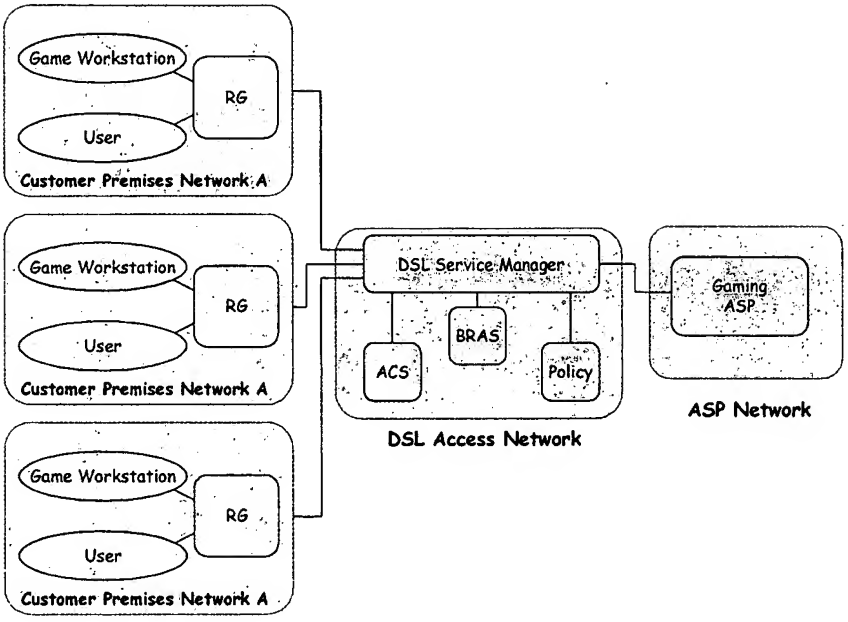

Game Workstation
RG
User
Customer Premises Network A
Game Workstation
RG
User
Customer Premises Network A
Game Workstation
RG
User
Customer Premises Network A
DSL Service Manager
BRAS
ACS
Policy
DSL Access Network
Gaming ASP
ASP Network

FIGURE 30

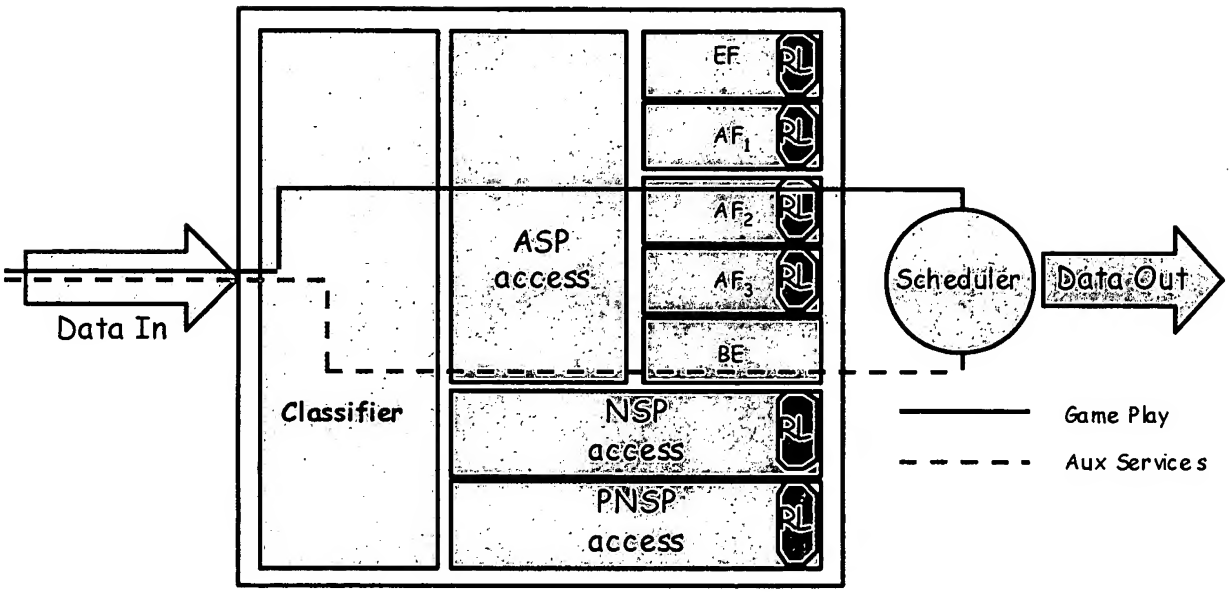
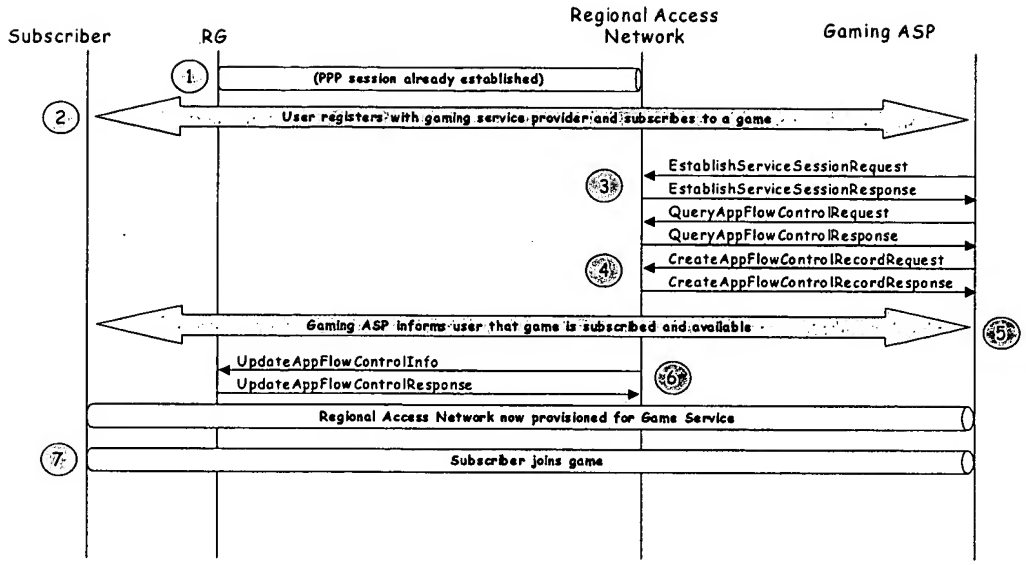

EF
AF1
AF2
AF3
BE
ASP
access
NSP
access
PNSP
access
Classifier
Data In
Scheduler
Data Out
Game Play
Aux Services

FIGURE 31


Subscriber
RG
Regional Access Network
Gaming ASP
1
(PPP session already established)
2
User registers with gaming service provider and subscribes to a game
3
EstablishServiceSessionRequest
EstablishServiceSessionResponse
QueryAppFlowControlRequest
QueryAppFlowControlResponse
4
CreateAppFlowControlRecordRequest
CreateAppFlowControlRecordResponse
Gaming ASP informs user that game is subscribed and available
5
UpdateAppFlowControlInfo
UpdateAppFlowControlResponse
6
Regional Access Network now provisioned for Game Service
7
Subscriber joins game

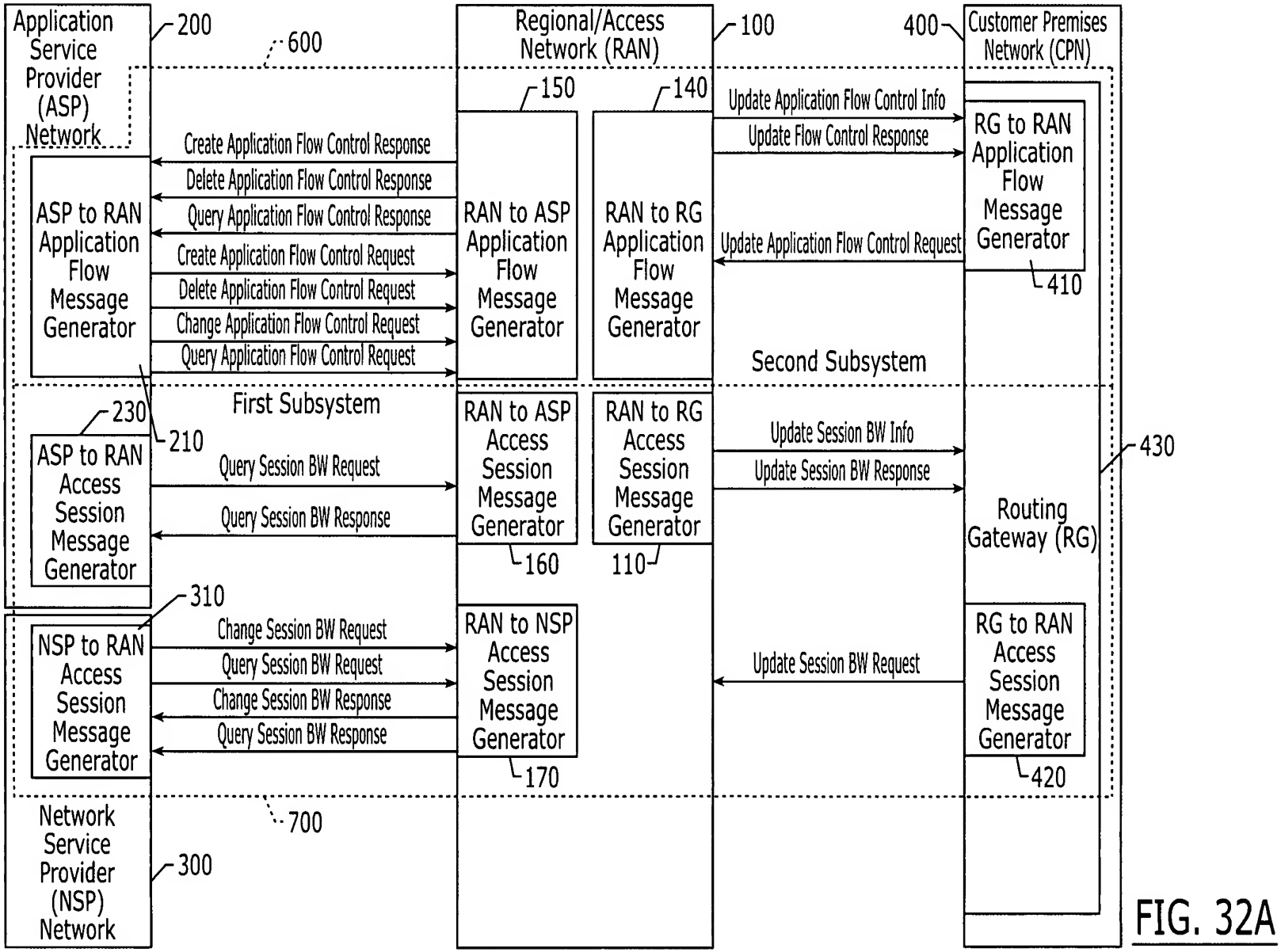

Application Service Provider (ASP) Network
200
600
Regional/Access Network (RAN)
100
400
Customer Premises Network (CPN)
150
140
Update Application Flow Control Info
Update Flow Control Response
Create Application Flow Control Response
Delete Application Flow Control Response
Query Application Flow Control Response
ASP to RAN Application Flow Message Generator
RAN to ASP Application Flow Message Generator
RAN to RG Application Flow Message Generator
RG to RAN Application Flow Message Generator
Update Application Flow Control Request
410
Create Application Flow Control Request
Delete Application Flow Control Request
Change Application Flow Control Request
Query Application Flow Control Request
Second Subsystem
First Subsystem
230
210
RAN to ASP Access Session Message Generator
RAN to RG Access Session Message Generator
Update Session BW Info
Update Session BW Response
430
ASP to RAN Access Session Message Generator
Query Session BW Request
Query Session BW Response
160
110
Routing Gateway (RG)
310
Change Session BW Request
Query Session BW Request
Change Session BW Response
Query Session BW Response
NSP to RAN Access Session Message Generator
RAN to NSP Access Session Message Generator
Update Session BW Request
RG to RAN Access Session Message Generator
170
420
700
Network Service Provider (NSP) Network
300

FIG. 32A

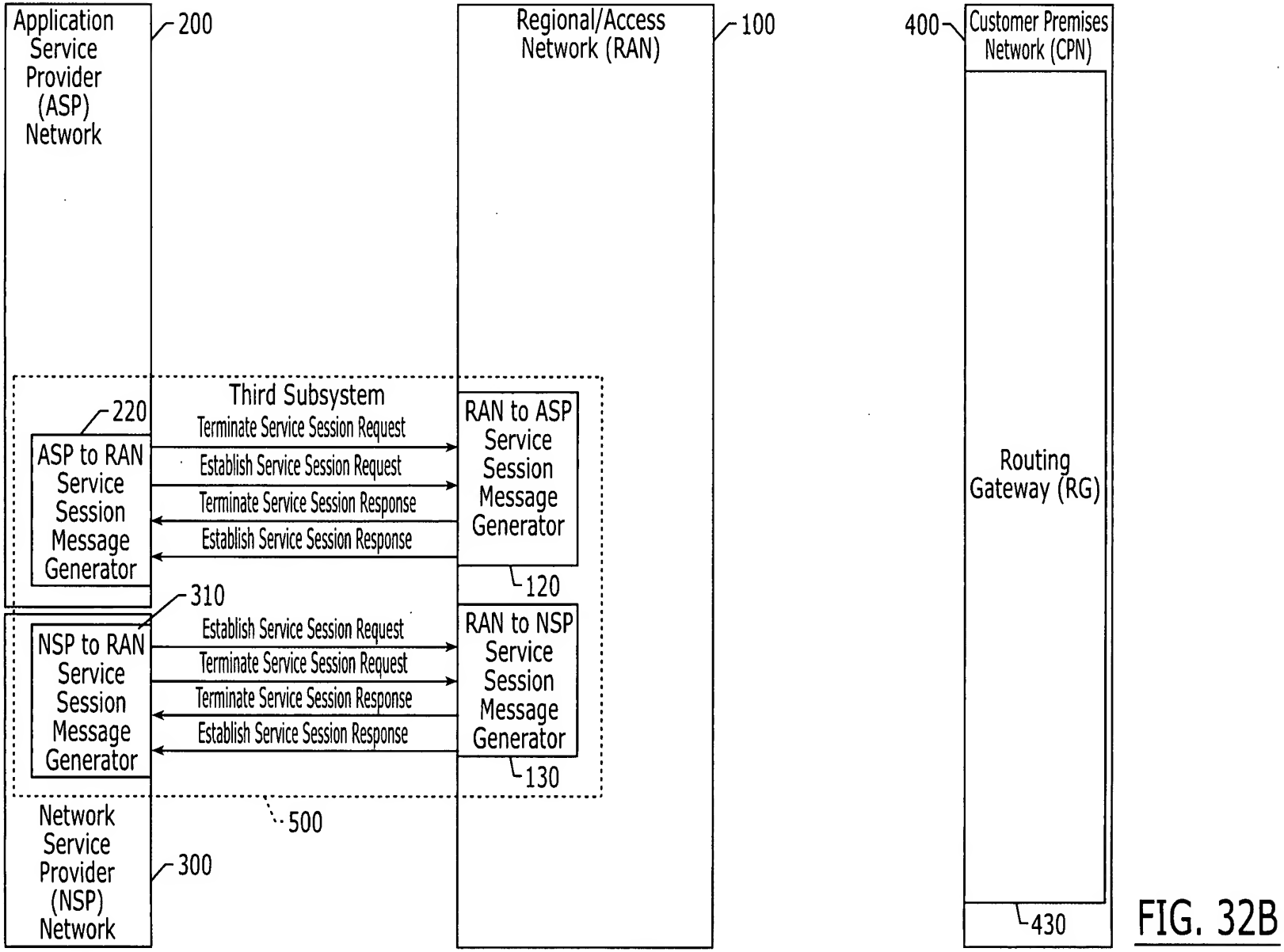

Application Service Provider (ASP) Network
200
Regional/Access Network (RAN)
100
400
Customer Premises Network (CPN)
Routing Gateway (RG)
430
Third Subsystem
220
ASP to RAN Service Session Message Generator
Terminate Service Session Request
Establish Service Session Request
Terminate Service Session Response
Establish Service Session Response
RAN to ASP Service Session Message Generator
120
310
NSP to RAN Service Session Message Generator
Establish Service Session Request
Terminate Service Session Request
Terminate Service Session Response
Establish Service Session Response
RAN to NSP Service Session Message Generator
130
500
Network Service Provider (NSP) Network
300

FIG. 32B

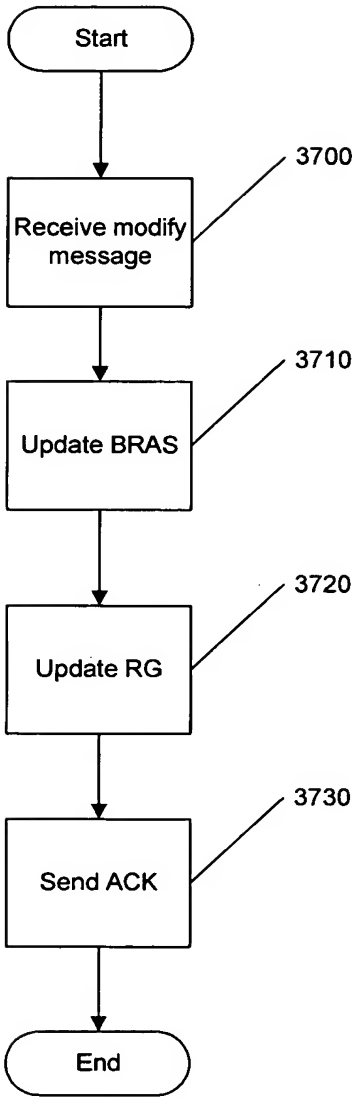

Start
3700
Receive modify message
3710
Update BRAS
3720
Update RG
3730
Send ACK
End

Figure 33